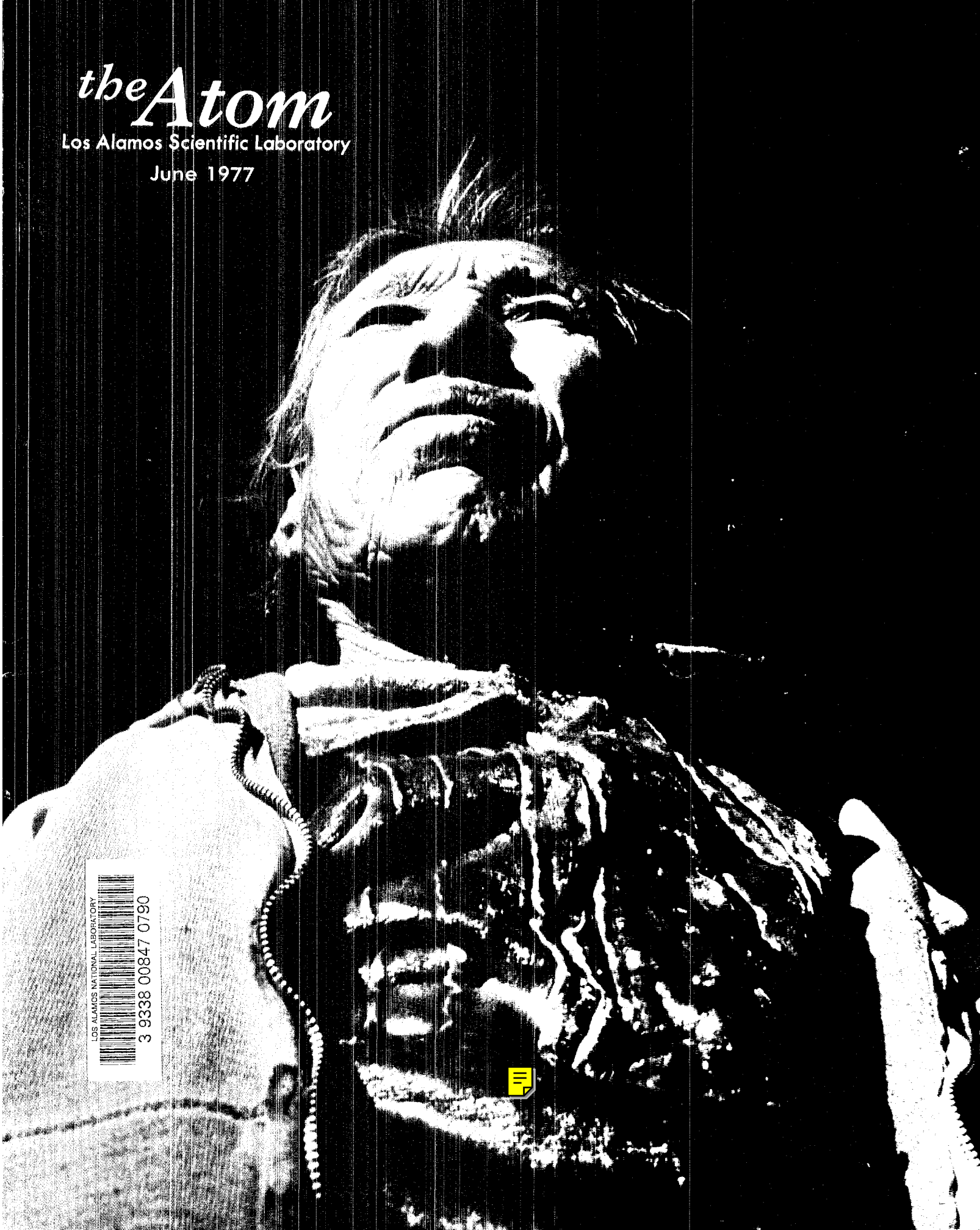
the Atom

Los Alamos Scientific Laboratory

June 1977



The Atom

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In this Issue

Regular Features

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Publisher

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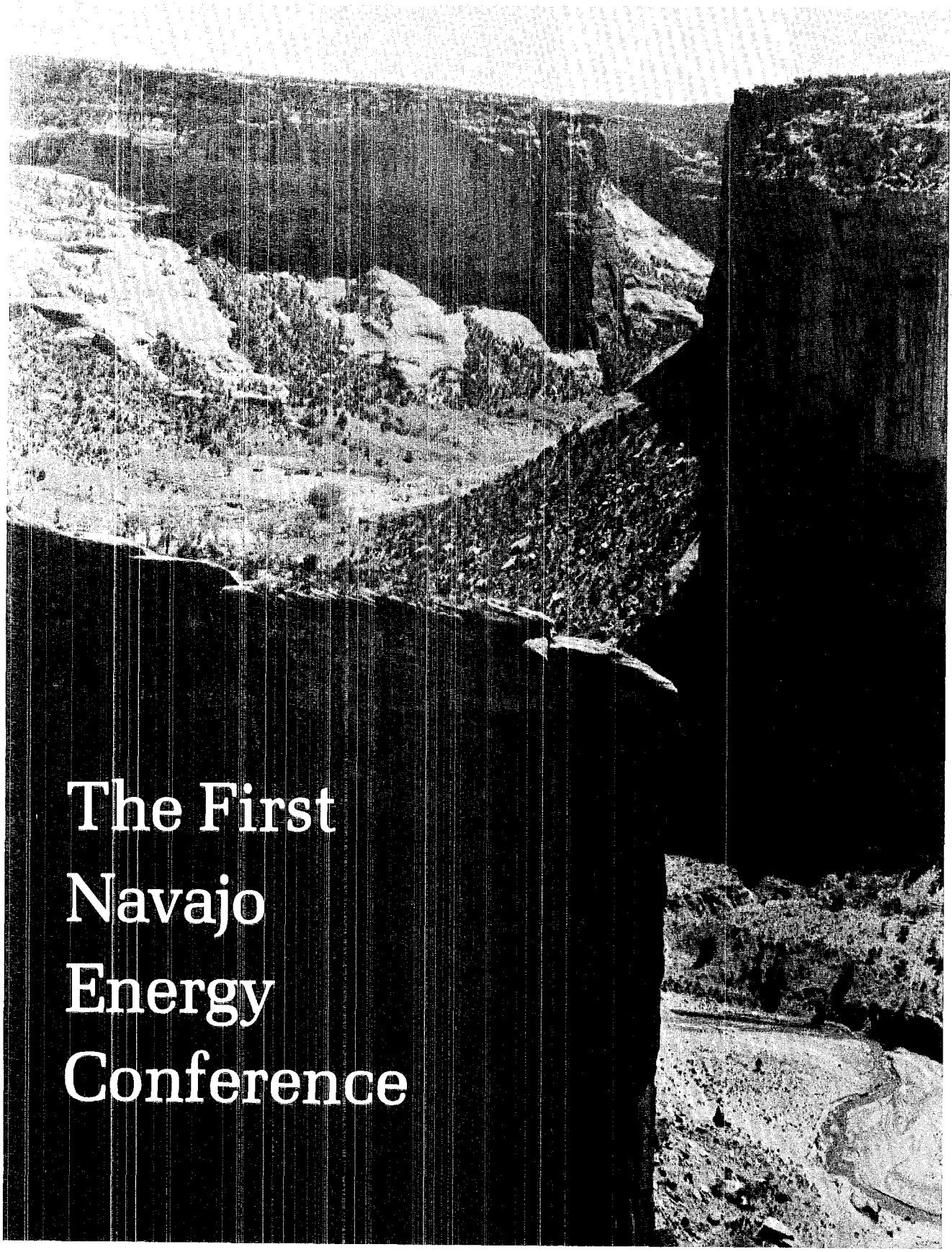
FRONT AND BACK COVERS

Johnnie Martinez took the front and back cover photos for this issue of the magaine. The Navajo woman pictured on the cover exemplifies strength and endurance of the Navajo people, and also seems to hint that the Navajos will meet the future with that strength. More photos and a story about the first Navajo Energy Conference begin on page 1. The back cover photo is an aerial view of the main technical area of LASL. An extremely "rough" flight gave Johnnie a greater appreciation for the firm soil of Pajarito Plateau.



The First Navajo Energy Conference

There Are No Easy Solutions

The first Navajo Energy Conference, organized to help planners in the Navajo Nation with immediate and long-range research problems, was held in May on the campus of the Navajo Community College in Tsaile, Arizona.

Navajo leaders attending the conference discussed energy conservation, ultilization, and current technology and heard presentations of information on new technology that may help the Navajo, and other Indian tribes, use their energy sources and resources.

The conference is sponsored by Research Applied to National Needs, a project of the National Science Foundation, and the Navajo Science Committee of the Navajo Community College.

Fred Young, with LASL's Laser Research and Technology (L) Division, is a Navajo and is chairman of the Navajo Science Committee. He is among a growing number of LASL personnel who are working with the Navajos to find solutions to a wide range of problems affecting the Indians. Young directed most of the activities of the day-long conference, which is expected to become an annual event.

Other LASL people taking part in the conference were Richard Malenfant, Q-14, who discussed the development of geothermal systems, J. Douglas Balcomb, assistant division leader for solar programs in LASL's Energy (Q) Division, who talked on passive solar energy systems, and Richard Tas-

A Navajo woman moves her sheep along a highway right-of-way to a pasture in an age-old fashion. Nearby is the modern Navajo Community College, site of the first Navajo Energy Conference.

chek, associate director for research at LASL who summarized the day's discussions.

Geothermal systems were described as having possible application to the Navajos, since hot, dry rock suitable for drilling and establishing geothermal energy sites underlies much of the Navajo Reservation. Balcomb suggested to the Navajos that solar heating systems be strongly considered when new buildings are planned on the Reservation.

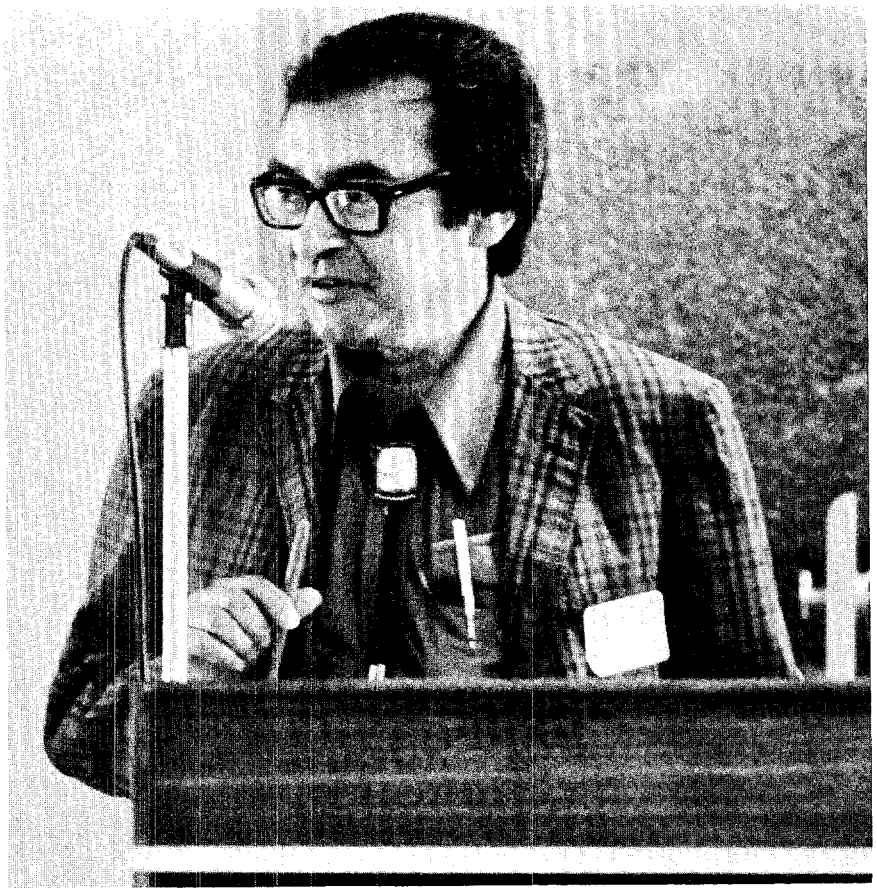
Taschek summarized conference activities, carefully pointing out that there are no easy solutions, and that almost any energy-related action can have reactions affecting lives, the environment, and the Navajo economy.

Peter MacDonald, chairman of the Navajo Nation and chairman of the Council of Energy Resource Tribes (CERT), welcomed the conference attendees, numbering more than 200. Young and Don McCabe, acting president of the Navajo Community College, also had welcoming remarks.

MacDonald pointed out that it is important for all Navajos, but especially the tribal leadership, to understand energy needs and requirements. Since the Navajo Reservation contains much uranium, coal, oil, and natural gas, said MacDonald, any U.S. energy policy affects Navajos as users and owners of resources.

Other topics discussed during the conference included special water

In the photo at right, Fred Young, chairman of the Navajo Science Committee of the Navajo Community College, directs activities of the first energy conference. Young is with LASL's Laser Research and Technology (L) Division. Below, Peter MacDonald, chairman of the Navajo Nation, addresses conference attendees and participants, including J. Douglas Balcomb, assistant division leader for solar programs in LASL's Energy (Q) Division.

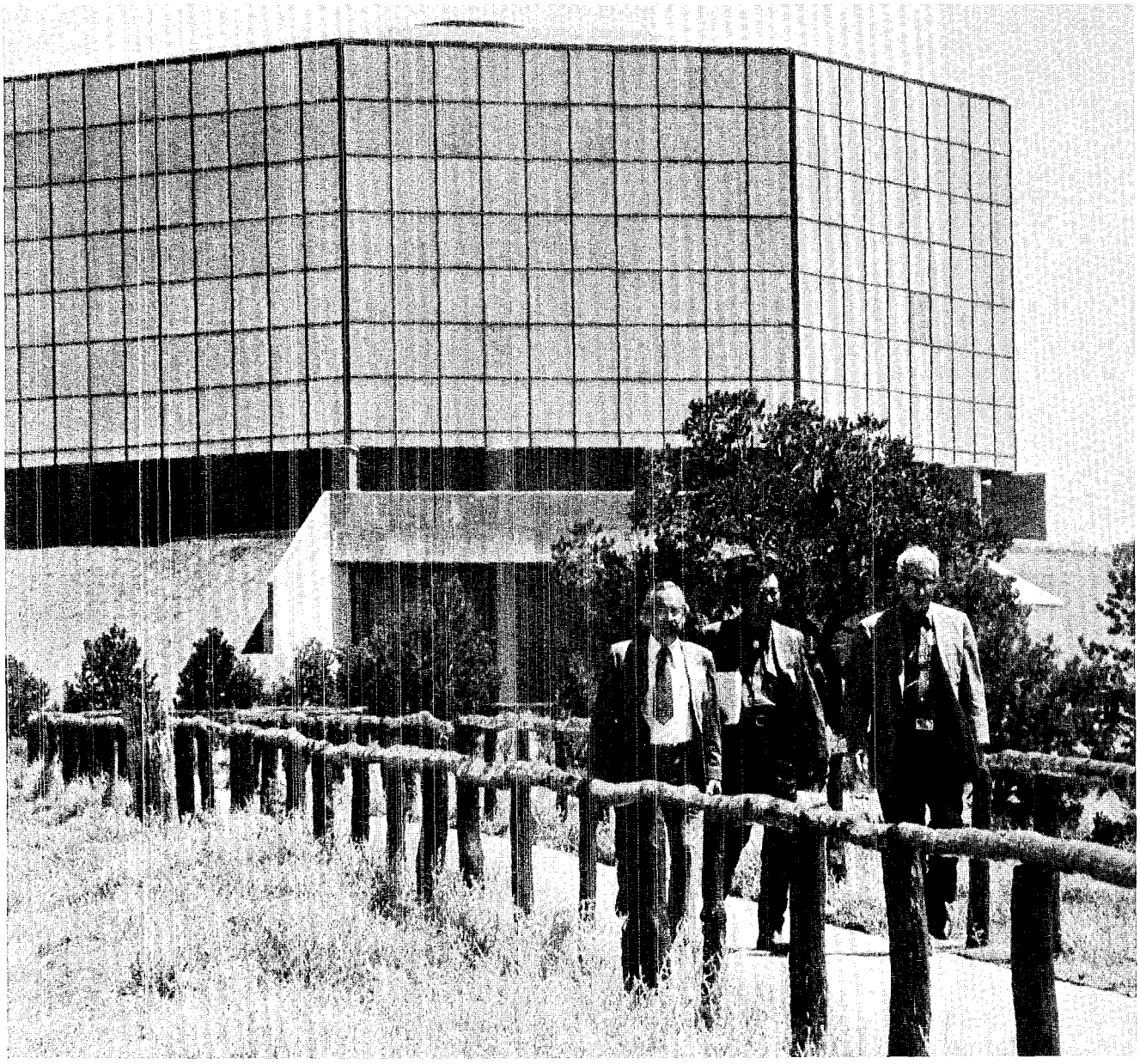


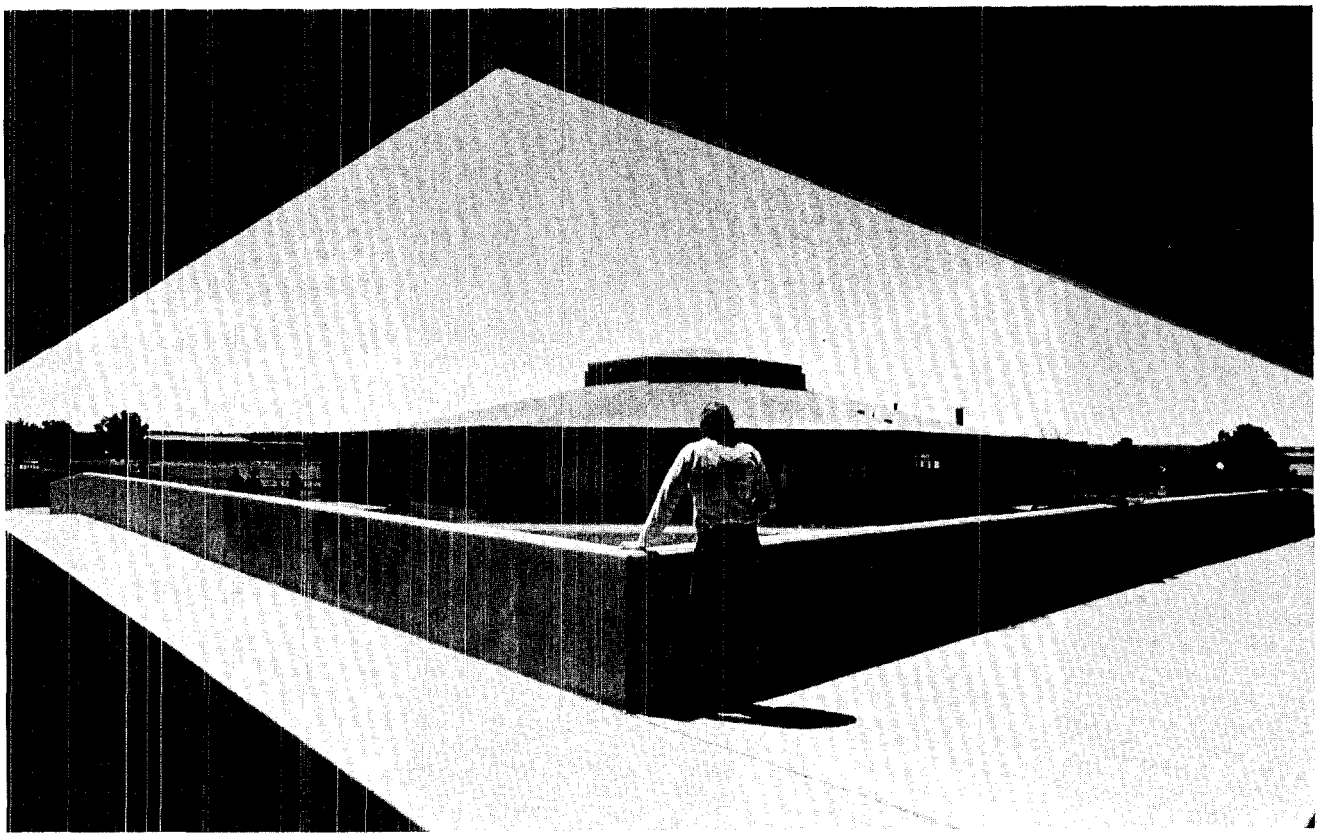
rights for Indians, the importance of water in development of energy policies, use of wind energy, Navajo business development, advantages of Navajo coal for heavy-use areas such as Southern California, the impact of power plant development, effects of air pollution, development of brackish waters, Navajo taxation of non-Indians, and development financing.

Conference speakers and the Navajo Tribal Council concluded that additional, more detailed conferences are needed to address energy and other problems affecting the Indians.

Young noted that the first Navajo Energy Conference could not solve the many energy problems facing the Navajos, but it encouraged additional work and research into problems the Navajos share with other Indian tribes and the rest of the United States.

Richard Taschek, right, LASL's associate director for research, Young, center, and another conference participant toured the college campus between sessions.





The cafeteria at Navajo Community College, top photo, as viewed from the walk in front of the student center. In the photo at right, Richard Malenfant, Q-14, discusses development of geothermal energy systems.

New Mexico

Colorado

Wyoming

Montana

Alaska

Uranium: The Search Continues

Los Alamos Scientific Laboratory is well into its 5-year Hydrogeochemical and Stream Sediment Reconnaissance (HSSR), a part of the National Uranium Resource Evaluation (NURE) program. The LASL is responsible for carrying out the HSSR in the 4 easternmost Rocky Mountain states and Alaska.

The program, which attempts to obtain a natural water or water-transported sediment sample every 4 square miles if possible, began in 1975. LASL is one of 4 Energy Research and Development Administration (ERDA) laboratories involved in the extensive effort to delineate uranium districts throughout the United States to help the country meet its projected demands for the metal into the 21st century.

LASL's region — New Mexico, Colorado, Wyoming, Montana, and Alaska — comprises 1.1 million square miles, or about 35% of the area of the United States, and LASL personnel, headed by G-5 Group Leader Robert Sharp, will supervise the collection of nearly 500,000 samples from 250,000 locations over the 5-year period ending in 1980.

Wherever possible, the water and sediment samples (more than 100,000, or 20% of them, already have been recorded) are being taken from springs, small streams, small lakes, and wells, all plotted on a rough but predetermined grid controlled by the drainage pattern, and described as to local environment and source. All this is being done according to rigidly written procedures.

The reconnaissance samples are being taken in the field generally by private contractors, while pilot and orientation studies are being done by each of the various state universities throughout LASL's region of responsibility. LASL supervises the sampling, documents the process of sampling and testing, and delivers 100 copies of the HSSR results to ERDA's Grand Junction Office, in Colorado, for open filing

to the public. Basically the same procedures are used by the other 3 laboratories, Lawrence Livermore Laboratory, Oak Ridge Gaseous Diffusion Plant, and Savannah River Laboratory.

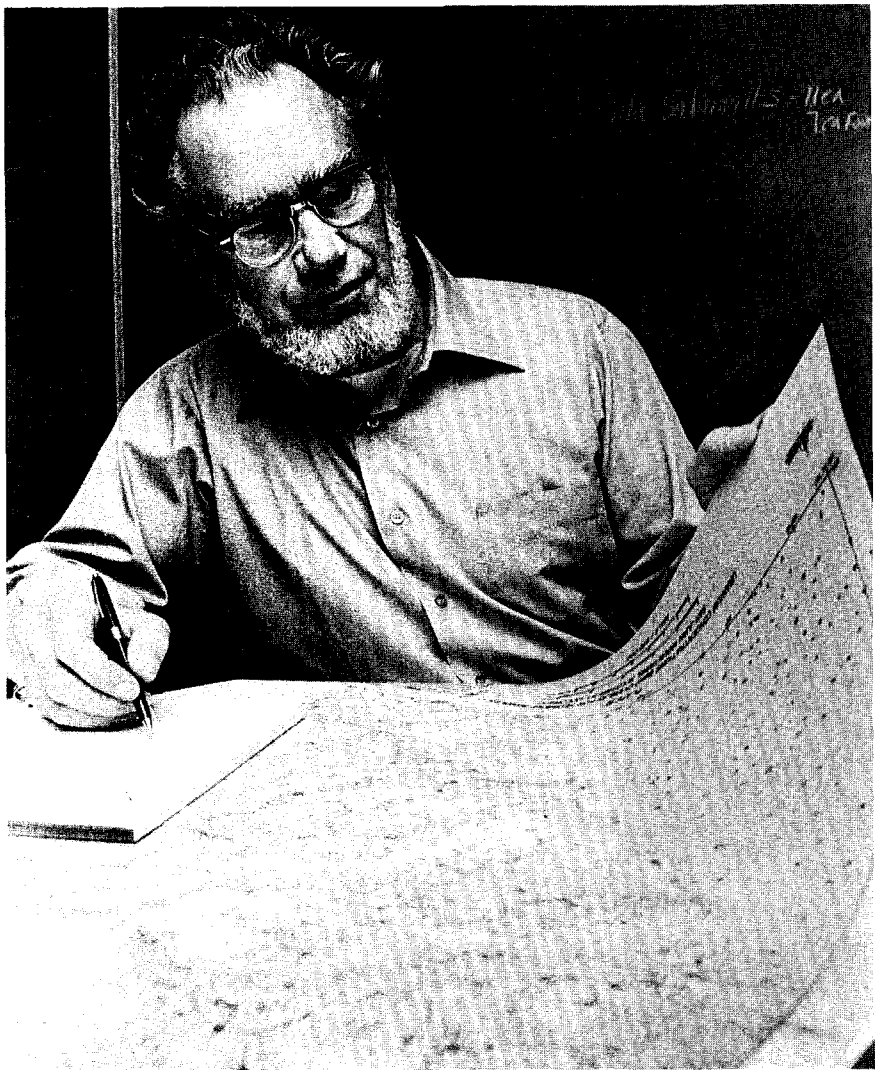
In some cases, where wells or surface water are scarce, dry stream sediment samples are required instead of wet sediment or water, to provide areal coverage. The volume of water or sediment samples can be very small, about a cup of the water and even less of the fine fraction (-100 mesh) of the sediment.

The goal is to analyze each sample for the most appropriate chemical properties and elements, to the most appropriate determinable levels, in the most appropriate and cost-efficient manner, to provide data for statistical treatment which will delineate districts most likely to contain uranium ore bodies or to have undergone alteration of the type indicating that the formation of uranium ore bodies is presently going on.

Setting up the procedures for the HSSR, according to Sharp, was the most critical part of the program. The essential components are organization and planning, field sampling, sample analysis, data handling and presentation, and data evaluation and publication of the results, with the last of these proving most difficult.

The HSSR program at LASL is coordinated through the office of the associate director for research, administered by G-Division, and managed by Group G-5, geochemical applications (formerly J-5, applied earth sciences), which has responsibility within the Laboratory for the overall design, field operations, and program execution.

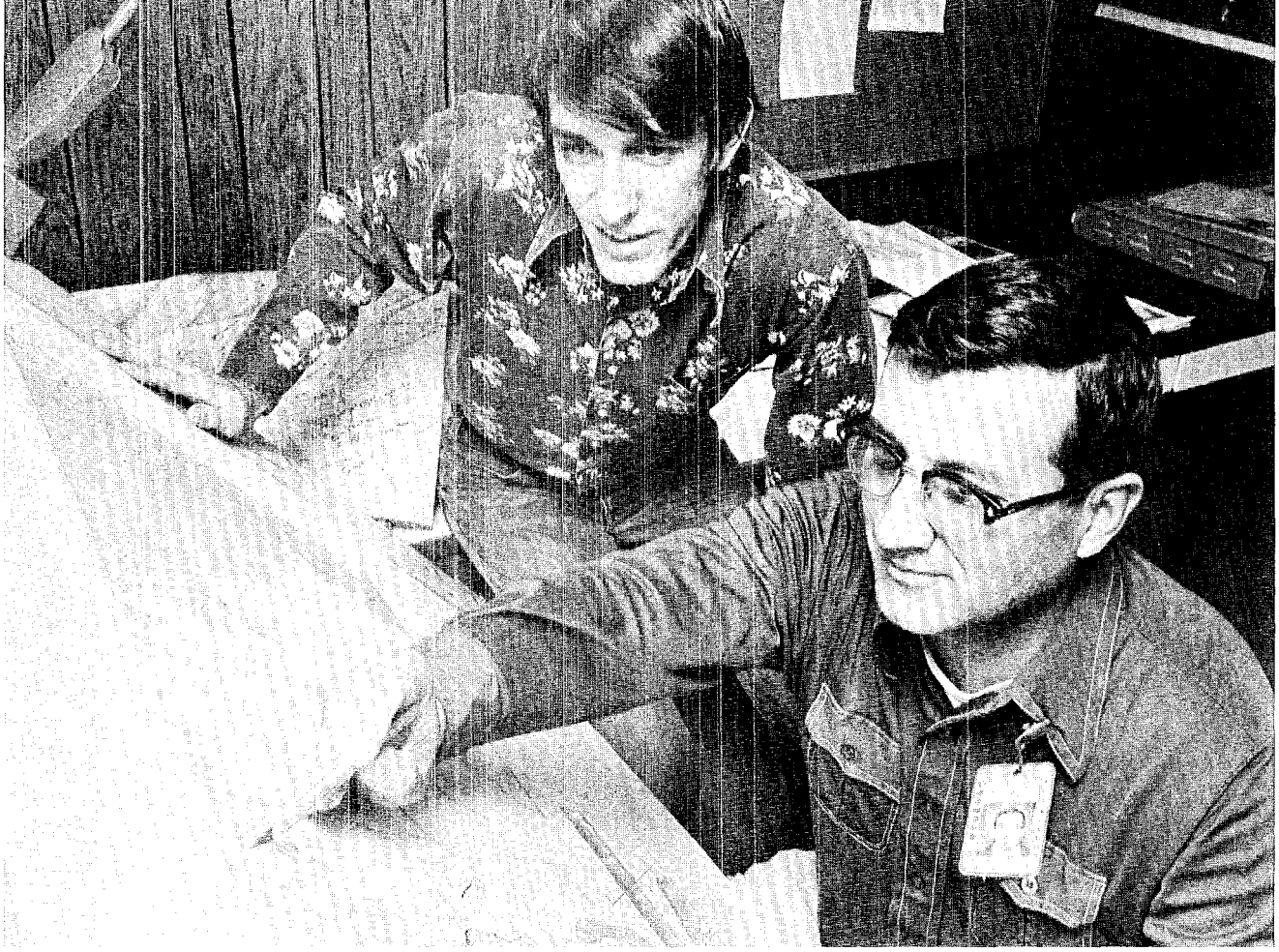
The analytical support for the program at LASL is provided by Groups CMB-1, P-2, and Q-12, and outside consultants are also used. Support and services provided by SP-DO, Group CMB-6, and numerous other LASL groups and departments are incorporated into the program organization. Technical design of the HSSR program was based on world literature on the subject, pilot studies, and orientation surveys.



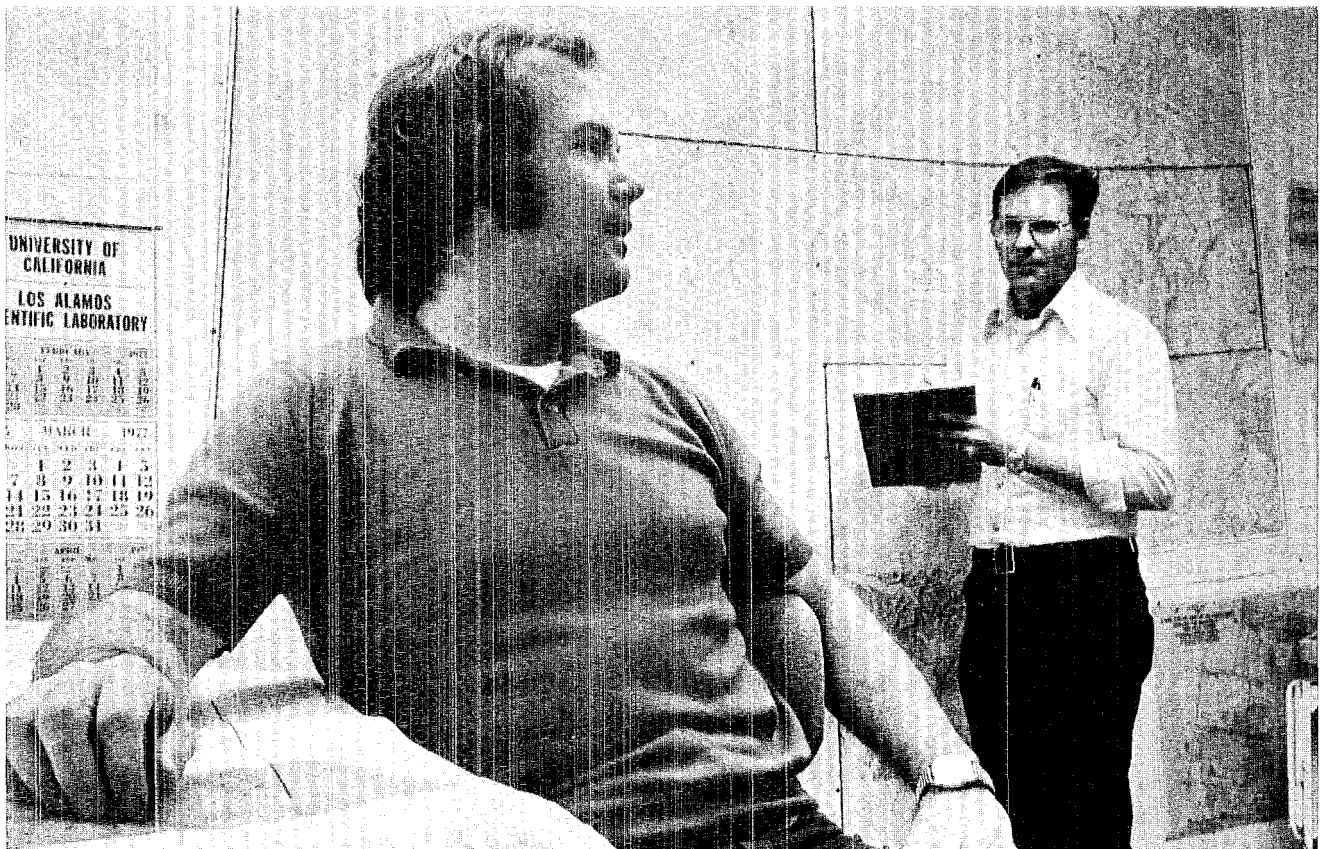
Jim C. Maxwell looks at an overlay over a geologic base map which is part of the first reconnaissance report on the San Juan Mountains completed by Group G-5.

At present, the sampling is designed to optimize the uranium search and provide archival storage as well, because the samples are also of great value in reconnaissance exploration for many other valuable elements. Collection of water and sediments samples is at the density of 1 location per 4 square miles in all of the lower contiguous Rocky Mountain states and in about one-third of Alaska, and at a density of 1 location per 9 square miles in the lake areas (about two-thirds) of Alaska.

In order to maintain the collection schedule, about 100,000 samples from 50,000 locations per



Geologist Dave Brockston, left, and draftsman Al Marquez work on a geologic base map, above, and in the bottom photo, geologist Paul Aamodt and metallurgist Dwight Hill discuss information from sampling efforts in Alaska.



year must be taken. The sample locations and specifications are predetermined by LASL, and in some cases pilot studies by universities are incorporated in the predeterminations. The reconnaissance sampling is done by private contractors with periodic inspections by the personnel of Group G-5.

All water and sediment samples are analyzed for uranium, and at the present time multielement analyses are made only where proven of value for uranium reconnaissance or otherwise funded (ERDA presently is funding analyses only for uranium in the program samples).

Uranium concentrations in the water samples are now routinely determined down to 0.02 parts per billion (ppb) or 20 parts per trillion (ppt) by fluorometry, and fluorometric analyses can be done at a rate of between 150 and 200 samples per day. This work is done by Group CMB-1, under the direction of William Ashley and Glenn Waterbury, CMB-1 Group Leader.

The uranium in water and sediment samples can be routinely determined down to 0.25 ppb by delayed-neutron counting with high precision, and as many as 700 samples per day can be analyzed by this method. This work is done by Mike Minor and others of Group P-2 at the Omega West Reactor, under the direction of Merle Bunker.

Analytical lines utilizing emission spectrography and X-ray fluorescence, at CMB-1, and neutron activation analysis, at P-2, can provide rapid determination of about 30 other elements in the samples in addition to uranium when this is necessary or when funds from agencies others than ERDA are available.

Along with other methods, water and sediment sampling in search of uranium has been carried out in many parts of the world throughout at least the past 20 years. The reconnaissance methods provide rapid, economical, and fairly complete coverage in the search for possible uranium districts over large regions. They can help in assessing uranium reserves and indicate areas that are promising for further exploration by private industry, and thus save much time and money that would have to be expended in other reconnaissance exploration methods.

In the oxidized mineral forms often found in nature, uranium has a fairly high solubility in water relative to most other commercially valuable metallic elements, according to Sharp. Consequently, if there is a concentration of uranium in the ground, it will most often get into the groundwater and show up locally at higher levels than in the surrounding barren areas. Uranium even gets into surface waters through well-recognized hydrologic processes as well as by convection, a process in which surface water infiltrates to depths were it dissolves the uranium it encounters, is heated geothermally, and returns to the surface carrying the traces of mineralization. Also, organic materials found in the sediment of many lake bottoms and streams absorb uranium, thus integrating over the long-term the uranium content of the surrounding water. So, here again, the relative levels of uranium in sediment can delineate areas where higher than average concentrations of uranium occur in the ground.

The water sampling method has resulted in discovery of uranium sources, is direct, and provides the advantage of looking into the ground to a certain degree without costly drilling.

Sharp emphasizes that LASL is not in the business of exploring for uranium, by saying, "You'll never find a uranium ore deposit by sampling a single spring, stream, or lake every 4 to 9 square miles." The Laboratory, as well as the other laboratories involved in the national survey, are simply providing private industry with good indicators leading to areas of interest for exploration and therefore to possible sources of uranium. The exploration, a much more detailed and costly process, is left up to private industry.

"It's a massive effort that needs to be done to aid in assessment of the nation's uranium resources and help industry find uranium ore, thus helping this country plan and meet its demands for the valuable metal in the years ahead," concludes Sharp.

short subjects

Lois E. Godfrey, assistant head librarian at LASL, has been elected vice president and president-elect of the New Mexico Library Association. Godfrey, who has been employed at LASL since 1954, has held several positions with the Association, which has 700 members in academic, public, school, and special libraries in New Mexico. She also has held positions in the Special Libraries Association.

A polarized-beam summer study is scheduled at the Clinton P. Anderson Los Alamos Meson Physics Facility (LAMPF) June 14-17. Topics for the study session include theory, discussion of recent results in nucleon-nucleon elastic scattering with 300- to 500-MeV polarized beams, and experimental methods.

Group T-6 was transfered from T-Division to L-Division in May and became Group L-6, Laser Fusion Theory. **Dale Henderson** is group leader, **Joe Kindel** is alternate group leader, and **Nancy Wilson** is group secretary. The group is located in TA-35.

John C. Lucas, III, son of Mr. and Mrs. John C. Lucas, and Bill Ward, son of Mr. and Mrs. John Ward, have been chosen to receive a Regents Scholarship to universities in the University of California system. Lucas, whose father is employed in TD-7, will attend the University of California at San Diego, where he will major in physics. Ward, whose father is employed in CMB-5, will attend the University of California at Davis, and will major in acoustical engineering. Both men are 1977 graduates of Los Alamos High School. The scholarship is termed "the most distinguished recognition the Board of Regents can accord a student." It is a 4-year scholarship, with the stipend to be determined annually according to the need of the student.

The target fabrication section of Group L-4 has been formed into a new group, L-7, with **Jay Fries** as acting group leader, and **Sally Pederson** group secretary.

Retirements: **Warren C. Dunnigan,** SD-1, laboratory welder; **Virginia G. Heath,** CMB-5, material research technician.

Deaths: **Alice Matheson, AADP-1,** EDP Operator; **Herbert B. Fletcher, WX-3,** alternate group leader.

PATENTS

James D. Doss, MP-3, and **Charles W. McCabe,** E-5, were awarded U.S. Patent 4,016,886 on April 12, 1977, for inventing a method of localized tissue heating of tumors. The invention comprises essentially a low frequency radio-frequency generator operating in the area between 100 MHz and 1 MHz connected to a pair of electrodes which may vary in configuration and location. The position of the electrodes may be adjusted to provide the desirable heat in the tumor tissue while not heating healthy tissue nearby.

James M. Dickinson and **Robert E. Riley,** both CMB-6, were awarded U.S. Patent 4,012,230 on March 15, 1977, for a method of producing an improved tungsten-nickel-cobalt alloy. The method constitutes coating the tungsten particles with a nickel-cobalt alloy, pressing the coated particles into a compact shape, heating the compact in hydrogen to a temperature in the range of 1,400 degrees Centigrade and holding at this temperature for about 2 hours, increasing the temperature to about 1,500 degrees Centigrade and holding at this temperature for about 1 hour, cooling to about 1,200 degrees Centigrade and replacing the hydrogen atmosphere with an inert argon atmosphere while maintaining this elevated temperature for about one-half hour, and cooling the resulting alloy to room temperature in this argon atmosphere.

Martin S. Piltch, and **John P. Rink,** both AP-2, and **Charles R. Tallman,** AP-1, were awarded U.S. Patent 4,011,462 on March 8, 1977, for an invention that relates to a laser apparatus for generating a line-tunable pulsed infrared difference frequency output. The apparatus comprises a CO_2 laser that produces a first frequency, a CO laser which produces a second frequency and a mixer for combining the output of the CO_2 and CO lasers so as to produce a final output comprising a difference frequency from the first and second frequency outputs.

The Military At Lasl

You probably won't see them in uniform at Los Alamos Scientific Laboratory, but they are here.

Several scientific and engineering career officers of the Air Force, Army, and Navy engage in research at LASL in a military research associates program, and others serve as military liaison between LASL and the Field Command, Defense Nuclear Agency (FCDNA).

Liaison officers of the Air Force are Lt. Col. Robert W. Ohlwiler and Maj. David Lucas. Maj. Wayne D. Willis is the Army liaison officer, and LCdr. Barry Birch is the Navy liaison officer.

Assigned as military staff members in the research program are Maj. Dale Coy, Lt. Col. James Crowther, and Capt. Robert Keenan, all Army officers, and Capt. Gordon Lederman, Capt. Michael MacInnes, and 1st. Lt. Wayne Moomey, all Air Force officers.

The FCDNA office at LASL has 3 main functions: to collect and evaluate nuclear data, to maintain liaison between LASL and Department of Defense nuclear weapons development organizations, and to monitor research, design technology, and performance criteria for nuclear weapons systems under development.

The officers engaged in research participate in one of 3 programs. Termed the Laboratory Associate Program in the Air Force, the Navy Research Associates Program, and the Army Research Associates, the programs provide selected career officers the opportunity to broaden their experience by conducting scientific research applicable to their respective branches of service.

After being selected for a program, the officer is assigned to LASL or one of the other laboratories under ERDA auspices. The officer comes to LASL for interviews with various groups in divisions of the Laboratory, and finally selects the area of research most suited to his needs and those of his particular branch of service.

The officer's assignment to the group does not affect the employment ceiling point for the group, and the group is responsible only for providing office space, travel expenses, and equipment for the research or liaison officer to use. The officer's salary is paid by his branch of service.

The officers usually are in the grades of first lieutenant, captain, or major in the Air Force and Army, and lieutenant or lieutenant commander in the Navy. Degrees range from bachelors and masters degrees in electrical, chemical, mechanical, and nuclear engineering to chemistry, math, physics, computer science, and applied science.

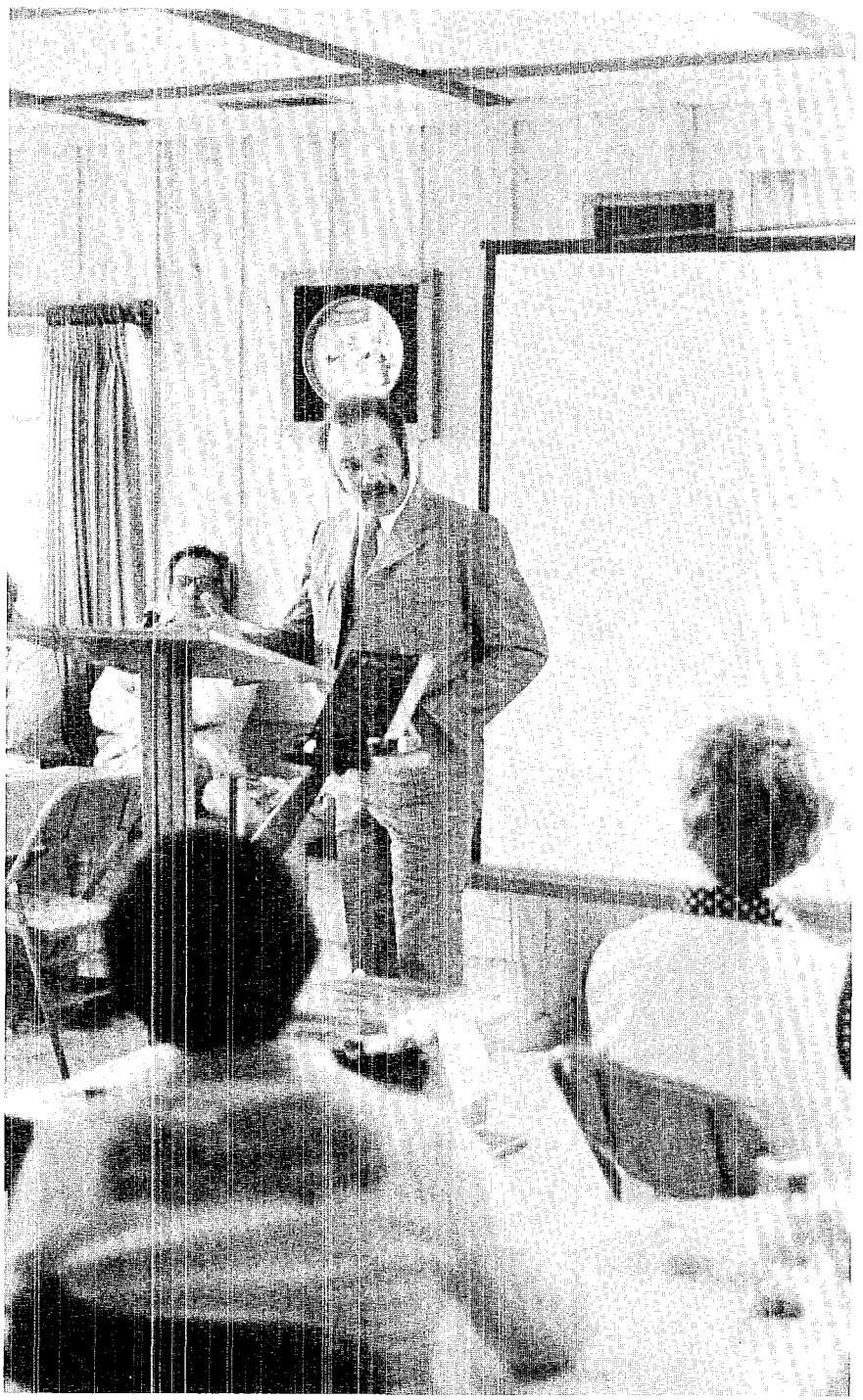
The Air Force Systems Command (AFSC) administers its Laboratory Assistance Program through the Air Force Weapons Laboratory (AFWL). After completing an assignment at LASL, an Air Force officer returns to AFSC to become part of a nucleus of highly experienced officers for assignment to projects or other laboratories. The AFSC also uses this program as a means of exchanging scientific research data between the civilian and military communities.

At LASL, the Air Force officers normally are placed in weapons research or related fields, and the tour of duty is 2 years. Between 5 and 8 research associates (presently there are 3 at LASL) are assigned to a laboratory, although the number may vary.

The Army and Navy programs are similar to that of the Air Force, except that the Army assigns 4 officers to LASL (presently, 3 are here), and the Navy has in the past provided 4 billets (positions), but no Navy officers currently are assigned to the LASL military staff (research associates) program. All 3 branches of service use the experience and knowledge gained by their officers in weapons research and other technical areas.

To Improve Awareness

AAR Conference Conducted



An Affirmative Action Representative (AAR) information retreat, sponsored by the Employee Relations Office and attended by AARs from every division and department at Los Alamos Scientific Laboratory, was conducted in May at Rancho Encantado, a resort north of Santa Fe.

The purpose of the 2-day retreat, filled with speeches, panel discussions, and films, was to make the AARs more aware of their duties and responsibilities in helping to eliminate discrimination in employment.

Topics covered in the sessions included highlights of Equal Employment Opportunity (EEO) laws and regulations that affect LASL, a more detailed presentation of the EEO regulations, Affirmative Action Plan procedures, a presentation of the selection order (job requirements, practices, advertising, pre-screening, testing, job descriptions, evaluations, interviewing), discussion of significant court cases (including a film on investigation, conciliation, and court procedures), an EEO compliance review and its meaning to LASL, changes in LASL hiring procedures, instruction in proper completion of AAR forms, and presentation of the grievance procedure at LASL.

In addition to program participation by LASL personnel involved in employment practices and employee

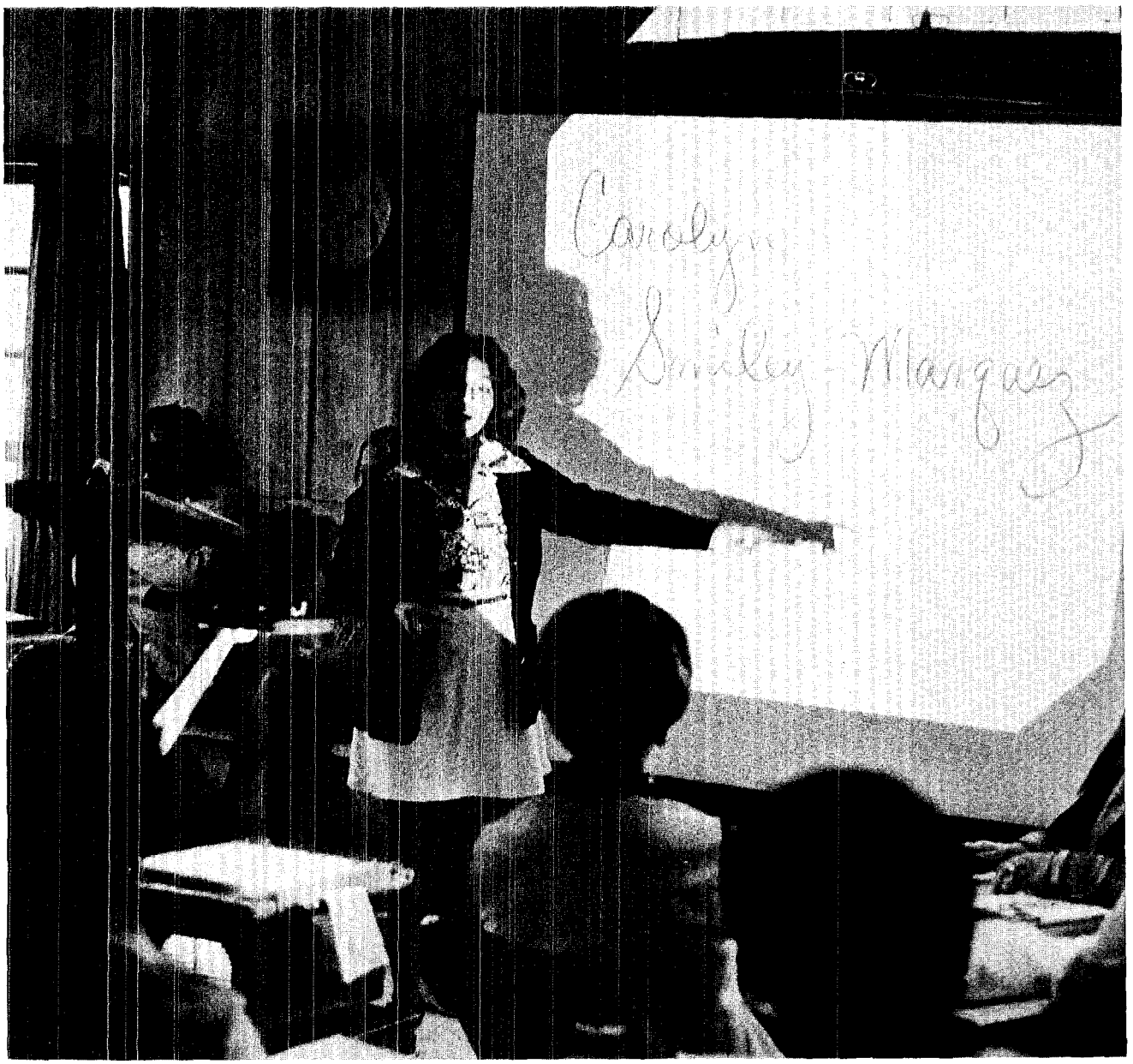
David M. Davies, executive director of the Albuquerque-Santa Fe Federal Executive Board, addresses a meeting of the affirmative action representatives.

relations, several speakers from outside the Laboratory took part, especially in a cultural awareness panel discussion.

They included Willie Alire, employed in the Office of Education of the Department of Health, Education and Welfare and presently working with the All-Indian Pueblo Council, and Joe Jimenez, a member of Alire's staff and a member of Nambe Pueblo.

Other speakers included David M. Davies, executive director of the Albuquerque-Santa Fe Federal Executive Board, on a 2-year assignment from the board's parent organization, the Albuquerque Operations Office of ERDA; Carolyn Smiley-Marquez, a program specialist for the Cross-Cultural Unit of the State Department of Education in Santa Fe, and Vincente Ximenes, presently serving as a private consultant to corporations, government agencies, and other organizations on management, equal employment, education, and economics. He has served as a Commissioner of the U.S. Equal Employment Opportunity Commission and as the vice president of the National Urban Coalition.

The AARs are appointed by each division and department to augment the Affirmative Action Pro-



Carolyn Smiley-Marquez, program specialist for the Cross-Cultural Unit of the State Department of Education in Santa Fe, illustrates a point in her lecture.

gram. They are responsible for identifying qualified ethnic minority and female candidates, through the Personnel Department and the Employee Relations Office, for job openings and promotions.

LASL, as an affirmative action/equal opportunity employer, is required to consider all job applicants without regard to their race, religion, color, national origin, sex, age, or physical or mental handicap within the limits imposed by law and University of California regulations.

... helping eliminate discrimination...

Joe Jimenez, a member of Nambe Pueblo and a Ph.D. candidate in higher education administration at Arizona State University, injects humor into his part of the program at the AAR educational retreat.

UNM Graduates Honored

The Los Alamos Graduate Center of the University of New Mexico (UNM) in May had its first convocation ever for graduates of the center. The event was held in the Physics Auditorium at Los Alamos Scientific Laboratory.

UNM Provost Chester C. Travelstead was convocation speaker, and presentation of graduate degree candidates was made by Bernard Spolsky, dean of the graduate school at UNM.

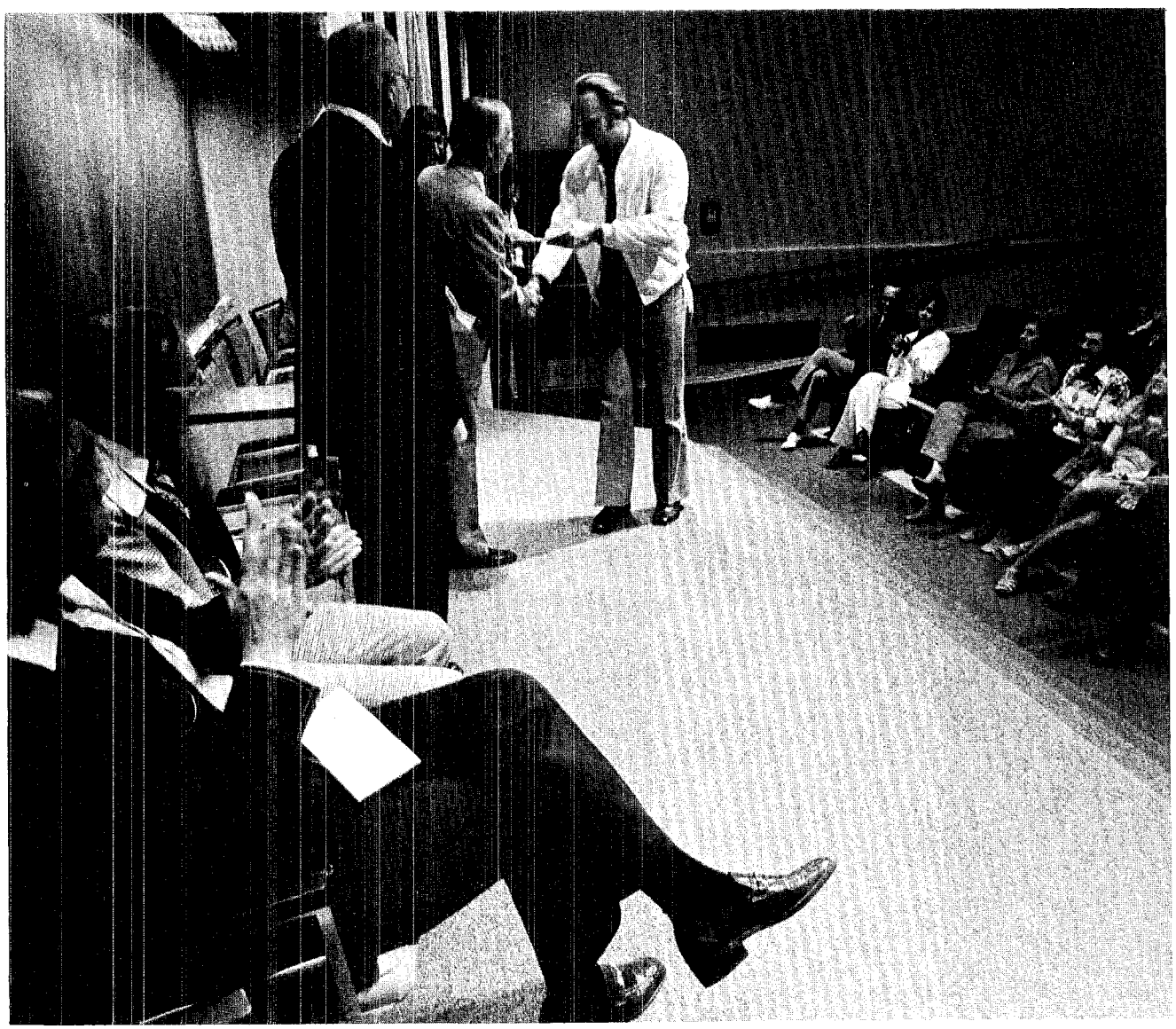
Shyam H. Gurbaxani, director of the Los Alamos Graduate Center (LAGC), introduced the guests, and Ted Dunn, university programs coordinator for LASL, discussed the accomplishments of the LAGC in its 21 years of operation.

H. Joe Trussell received a Ph.D. in electrical engineering/computer science.

Receiving master's degrees in electrical engineering/computer science were Glenn Carter, John Hafer, Ann Hayes, Nicholas Krisa, Jules Levin, Willa P. Lucas, and Eva Tucker.

Master's degrees in physics were earned by William J. Krauser and

One of several LASL and Los Alamos people to receive degrees from the University of New Mexico Graduate School, through the Graduate Center in Los Alamos, is congratulated by UNM Provost Chester C. Travelstead.



Willard Thomas, and in mathematics by David Roybal.

Bachelor's degrees in electrical engineering/computer science were presented to Martin Milder and Donald Terry. Bachelor's degrees in mechanical engineering were earned by William Hutchinson, Kenneth Imamura, and Louis J. Morrison. A bachelor's degree in mathematics was presented to Carlotta McInteer, and a bachelor's degree in university studies went to Ruth Demuth.

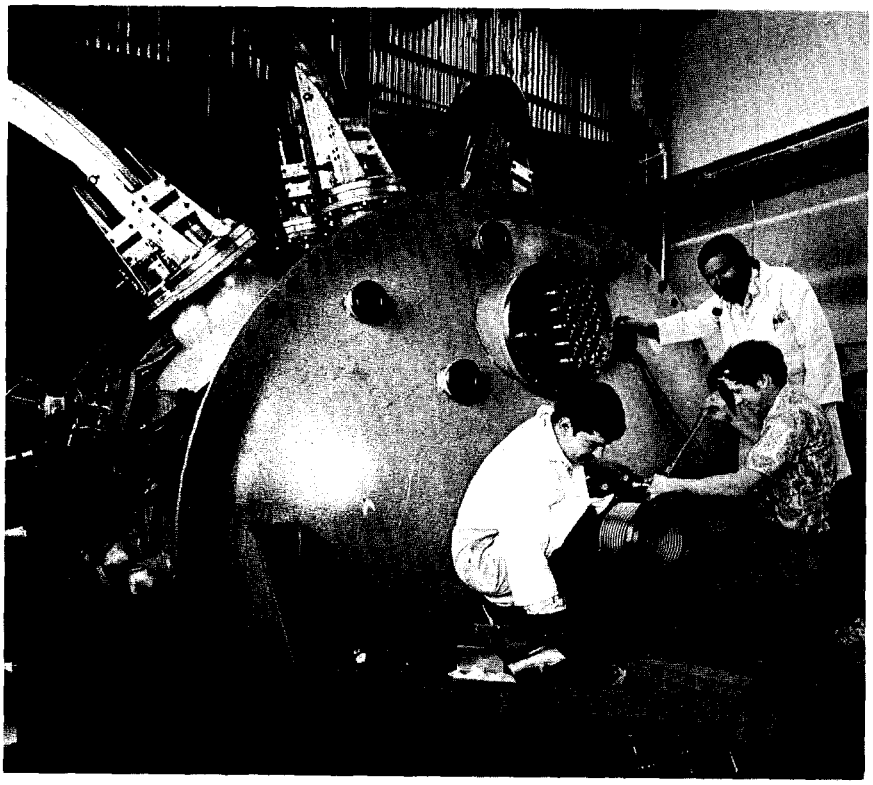
Associate degrees in instrument engineering technology were earned by Douglas Cramer, Shirley Davies, Sharman Kelly, Evita Medina, Jose Ortega, Richard Ross, Keith Takech, and Mike Ulibarri.

An associate degree in secretarial studies and office supervision was presented to Gwendlyn Casados.

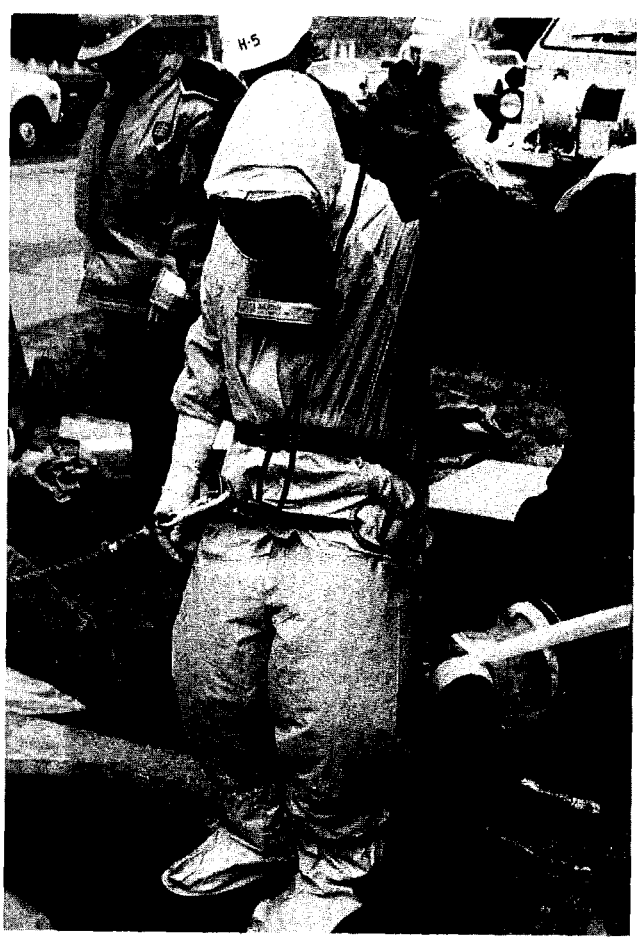
Edward Hammel, assistant director for energy at LASL, gave the concluding remarks.

Travelstead, right, was the convocation speaker, and in the bottom photo, Ed Hammel, assistant director for energy at LASL, congratulates another LASL employee receiving a degree.

Photo Shorts



Fermin Garcia, left, Terry Ganley, and Bill Bentley, all L-10, work on a power amplifier module for the prototype of the high-energy gas laser facility, construction of which is expected to begin this summer.



Johnny Harper, H-1, is about to be lowered into a 30-foot-deep manhole in front of the Los Alamos Medical Center to get samples of soil in the drainage system, which is being checked for evidence of possible radioactive contamination. The drainage system is near the intersection of Diamond and Trinity Drives, which is scheduled for reconstruction beginning this summer. Many years ago, waste water possibly containing radioactive matter was drained through this system, and before construction on the intersection can begin, drainage systems in the area must be inspected for possible contamination.

Safeguards Technology Program Gaining In Importance, Popularity

The Los Alamos Scientific Laboratory's Safeguards Program involves the development and evaluation of new safeguards techniques for the verification and measurement of special nuclear materials and the study of facility safeguards system designs. Measurement and accounting capabilities, when combined with surveillance, provide effective means for assessing the location, type, and amount of strategic material and credibly assuring that none has been diverted.

Timely transfer of newly developed safeguards technology to the nuclear community is essential to provide guidance for upgrading current safeguards procedures and planning for safeguarding increasing quantities of commercial nuclear fuels. One efficient method for technology transfer is the U.S. ERDA Safeguards Technology Training Program that is conducted by LASL. Principles and skills for safeguarding uranium and plutonium are taught to safeguards inspectors, plant personnel, and government representatives with safeguards responsibilities.

The safeguards training program began in 1973 when the U.S. Atomic Energy Commission (AEC) authorized LASL to conduct a course on the fundamentals of nondestructive assay (NDA). Initially, the enrollment was limited to AEC inspectors, but in 1974 it was extended to include government contractor personnel and later was opened to the national and international safeguards communities.

The annual program curriculum now consists of 4 one-week courses, 3 of which are concerned with NDA techniques and instrumentation and 1 that presents an overview of integrated safeguards systems. Participants in the training courses routinely include representatives of ERDA, the U.S. Nuclear Regulatory Commission (NRC), the national laboratories, private industry, and the International Atomic Energy Agency (IAEA).

The NDA courses were designed as a series to allow the participants to proceed from simple fundamental principles to state-of-the-art instrumentation. These courses emphasize "hands-on" use of NDA instruments to measure nuclear materials in the typical forms found in the industry, with lectures covering basic theory, instrument operation, and potential problem areas. Specially prepared manuals serve both as textbooks and as general reference sources.

Laboratory groups are kept small (3 to 5 persons), each group having its own instrumentation. LASL instructors interact closely with the attendees, not only on the assigned course work, but also in sharing experiences gained in field-implementation of NDA techniques.

The Program Has Expanded To 4 Courses

The first course in this series, Fundamentals of Nondestructive Assay Using Portable Instrumentation, is a basic introduction to the principles and techniques employed in passive gamma-ray and neutron assay of fissionable materials. The major topics include gamma-ray and neutron yields of fissionable materials, nuclear detectors, quantitative assay based on neutron and gamma-ray signatures, enrichment measurements, and verification methods. Laboratory exercises include such problems as the measurements of the enrichment of UF_6 in its shipping container or the measurement of the amount of material held up in an air filter.

The second course, Gamma-Ray Spectroscopy for Nuclear Material Accountability, familiarizes the students with powerful techniques for measuring special nuclear materials (SNM) that use high resolution gamma-ray detectors and sophisticated data reduction systems. The laboratory work and lectures on the principles cover not only the operation of the instruments but the practical range of their applicability, with stress on the "do's and don't's" of assay and achievable accuracies. The students perform isotopic analyses of plutonium and uranium and measure the concentrations of these elements in typical solutions and solids.

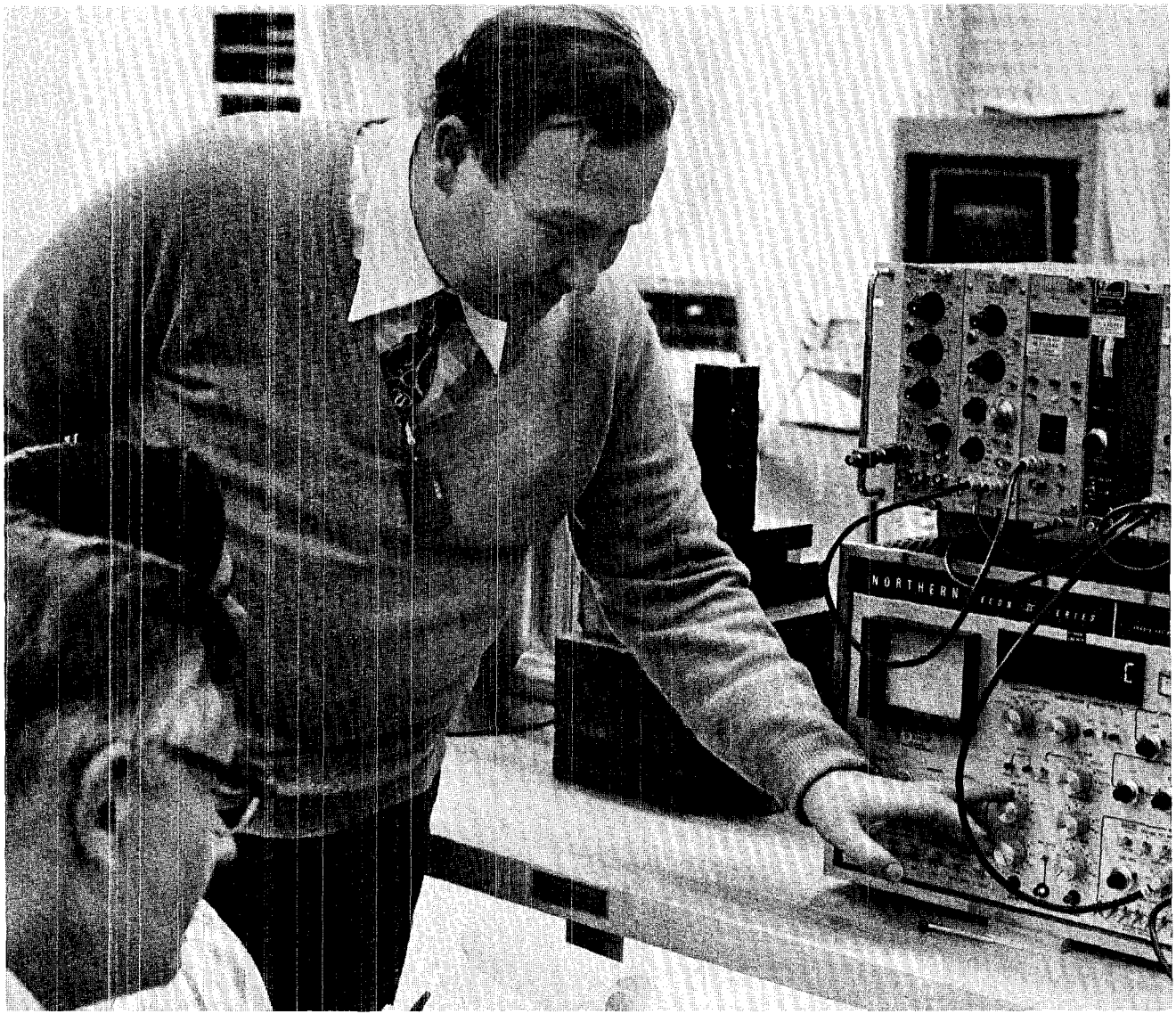
The third course in the instrumentation series, In-Plant Nondestructive Assay Instrumentation, is a study of 4 automated, LASL-

developed computer-controlled systems that are being incorporated into the safeguards systems of a number of nuclear facilities. Again, the focus is on the use of the instrument in the laboratory with lectures to provide a sound understanding of generic instrument types.

The newest course, entitled "Integrated Safeguards Systems—Concepts and Implementation," was introduced into the training program curriculum during the week of March 21, 1977. The course was conducted by individuals from the 4 LASL safeguards groups, Q-1, Q-2, Q-3, and Q-4, and from the Sandia Laboratories. It presented an overview of real-time dynamic materials accounting and control concepts and the techniques for their incorporation into practical safeguards plants through a series of lectures, demonstrations, and tours of LASL facilities.

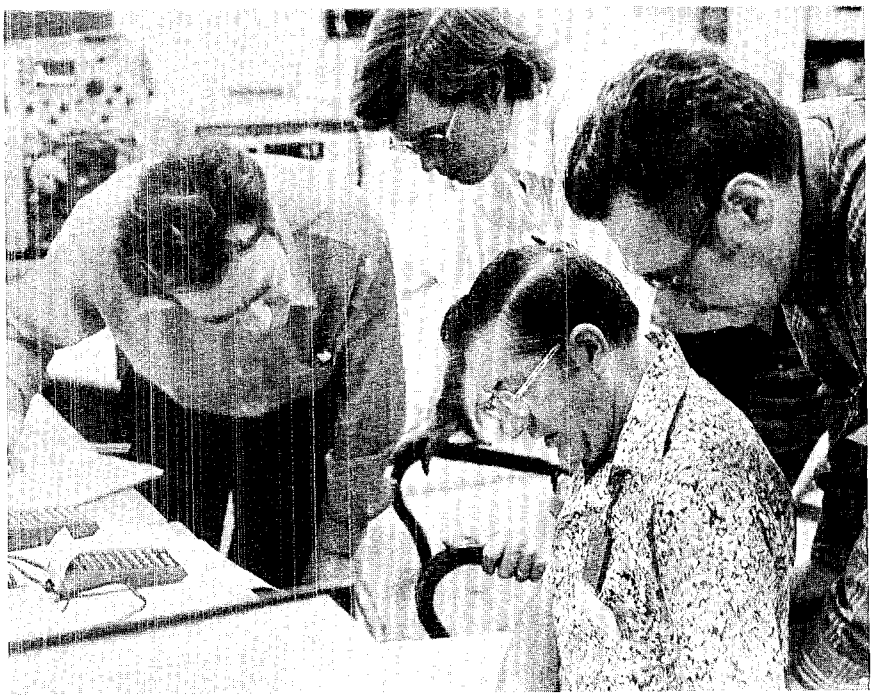
As an example of the implementation of an automated measurement and accounting system, the dynamic materials control (DYMAC) system currently being installed in the new LASL plutonium facility at TA-55 was described. The broad range of lecture topics included the conceptual design of coordinated safeguards systems, perimeter safeguards and emergency search capabilites, and experience with real-time nuclear material control. A new and im-

A. Lumetti, an Italian with the International Atomic Energy Agency (IAEA), adjusts console equipment during the recent safeguards training course at LASL. All IAEA members are based in Vienna.



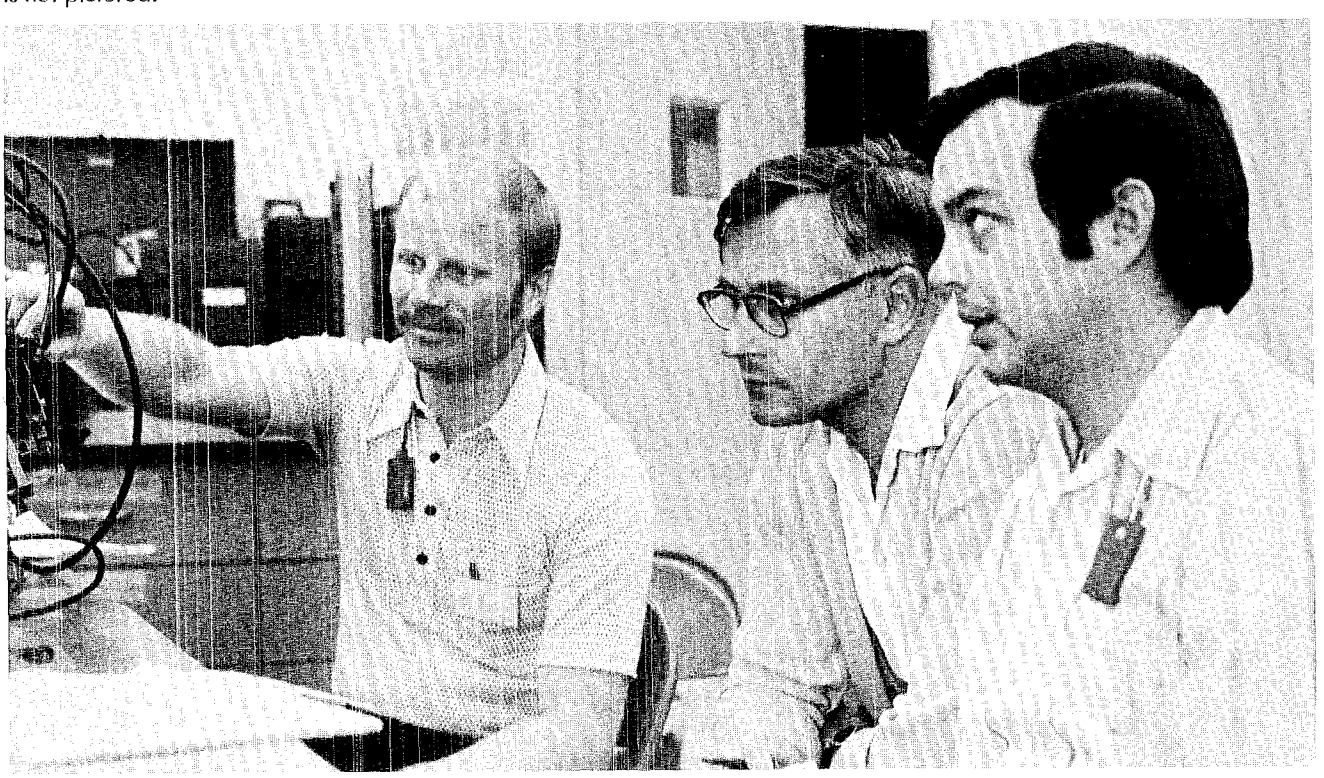
portant topic included in this course is the use of computer modeling and simulation of process flows and measurements to guide the design of safeguards systems for future nuclear facilities, as well as to aid in safeguards performance evaluation of existing facilities.

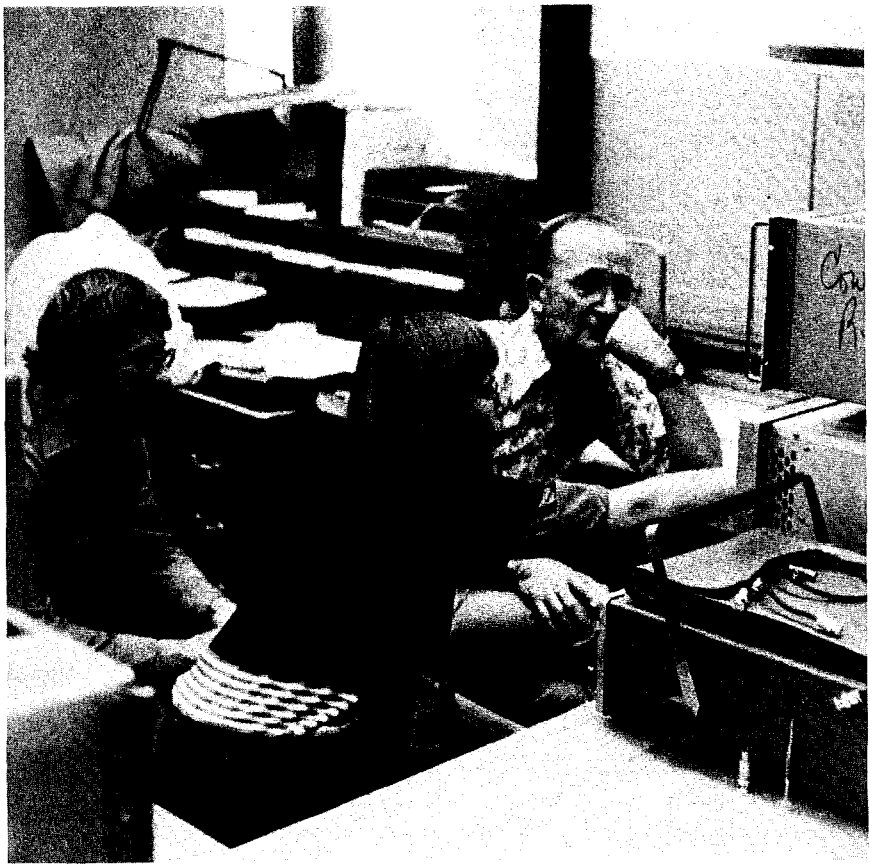
The growth in the scope of the courses offered in the training program and the number of participants attending has been dramatic since the program's inception in 1973. During the past year, 114 individuals, over 25 per cent of whom were foreign nationals employed by either the IAEA or their respective governments, attended the 4 courses. The continued vitality of this program is ample testimony to its important role in the transfer of safeguards technology to the nuclear community.



John J. Vronich, seated, Argonne Laboratory, and, left to right, Emannuel Yellin, IAEA (Israel), James Tape, Q-1, and Hal Werner, IAEA (U.S.), study problems of nuclear safeguards.

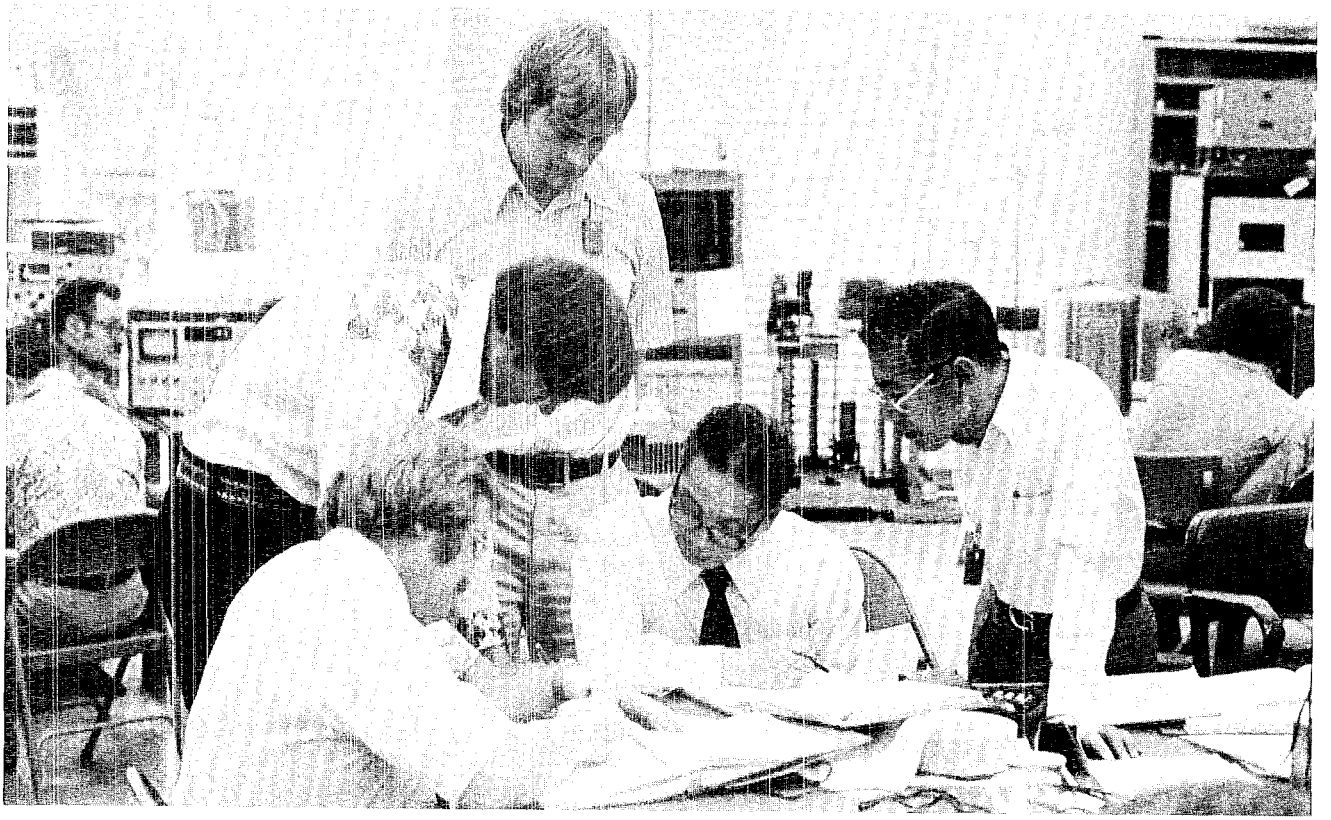
Taking part in the safeguards course on integrated systems are, left to right, Dan Smith, Nuclear Regulatory Commission, Donat Petrunin, IAEA (Soviet Union), and Neil Sigler, Nuclear Fuel Services. Mike Baker, Q-1 instructor for this group of participants, is not pictured.



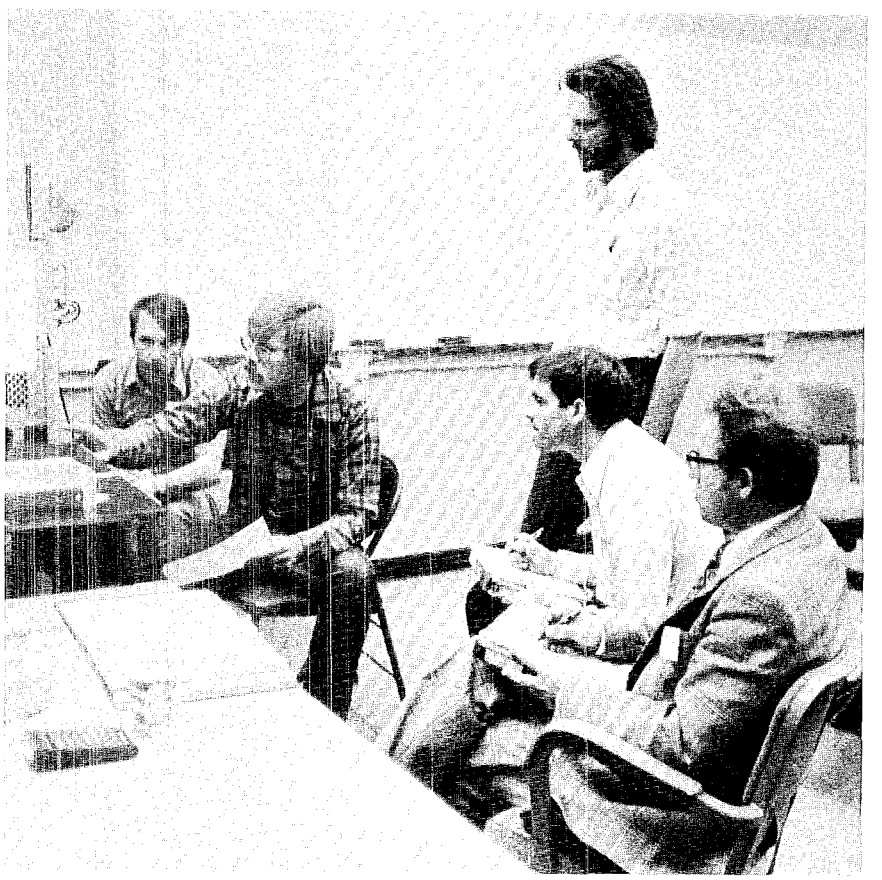


Assisting course participants Ed Blakeman, left, Oak Ridge National Laboratory, and Joe Goleb, ERDA in Washington, is Diana Langner, Q-1.

Jack Parker, back to camera, Q-1, instructs safeguards course participants, left to right, Jacek Kaniewski, IAEA (Poland), Neil Harms, IAEA (United States), Jack Jarvis, Mound Laboratories, and Martin Messinger, Nuclear Regulatory Commission, in use of nondestructive assay equipment.



Norbert Ensslin, Q-1, leaning over the table on the left, helps course participants, seated left, J. D. Sherwood, of Babcock and Wilcox, standing, Alan Proctor, Argonne, seated center, Byung Lee, IAEA (Korea), and Hayao Kawamoto, IAEA (Japan).



Tom Canada, Q-1, standing, observes the work of, left to right, M. W. Andrews, Exxon Nuclear Company, Cal Delegard, IAEA (U.S.), James Blaylock, Nuclear Regulatory Commission, and Ila Mishev, IAEA (Bulgaria).

Van Pools Are Studied

A second meeting of persons interested in van pools for commuters to LASL and Zia work areas in Los Alamos was conducted May 23, and several persons agreed to try to organize van pools in their residential areas.

Thomas Carroll, L-1 (667-6569), will contact interested commuters living in Santa Fe, Julia Wood, ISD-7 (667-5123), agreed to contact White Rock commuters interested in van pooling, and Ann Kopansky, Zia (667-4581), will try to organize van pools from Nambe, Pojoaque, and El Rancho areas.

Persons interested in organizing van pools from other areas to Los Alamos, but who did not attend the May meeting, can contact Kopansky for lists of persons in their areas who have expressed interest in van pooling.

Conducting the May 23 meeting were Phil Chavez, president of the State Employees Commuters Association (SECA), with which a majority of the commuters meeting at LASL's main auditorium earlier this spring agreed to affiliate to get help in starting van pools, and Eremita Campos, SECA secretary.

They provided more details of the SECA. There must be a driver and a co-driver for each van. The drivers arrange routine maintenance of the van at predetermined service centers, and keep the van clean inside and out. For performing these services, the drivers pay one-half the fare assessed the riders.

Drivers must be 25 years old, have no citations within the past 3 years, and have or be willing to get a chauffeurs' license. They, working with any other organizers for their route, will set pick up and drop off points and times for the riders.

Additional information about the van pooling concept, and the organization of specific van pools in a particular area, can be obtained by calling the people already mentioned, and Chavez, 827-2485.

10 years ago in los alamos

Culled from the June, 1967 Files of The Atom and The Los Alamos Monitor
By Robert Y. Porton

Transfer

After 25 years, the umbilical cord between the federal government and the Los Alamos community was symbolically snipped with a few strokes of a pen. At ceremonies Saturday, the AEC signed over title to some $17-million in property and utility systems which the county will operate after July 1. Attending the ceremony were U.S. Senator Joseph Montoya, U.S. Representative E. S. Johnny Walker, and New Mexico Governor David Cargo.

New President

Raemer E. Schreiber, Technical Associate Director of the Los Alamos Scientific Laboratory, has been elected president of the American Nuclear Society. He will take office June 15 at the 13th annual ANS meeting in San Diego. Schreiber has been with the Lab since its inception in 1943, coming to Los Alamos from Purdue University, where he had worked on the Manhattan Project since 1942. He has served on the ANS board of directors since 1962 and was ANS vice president last year.

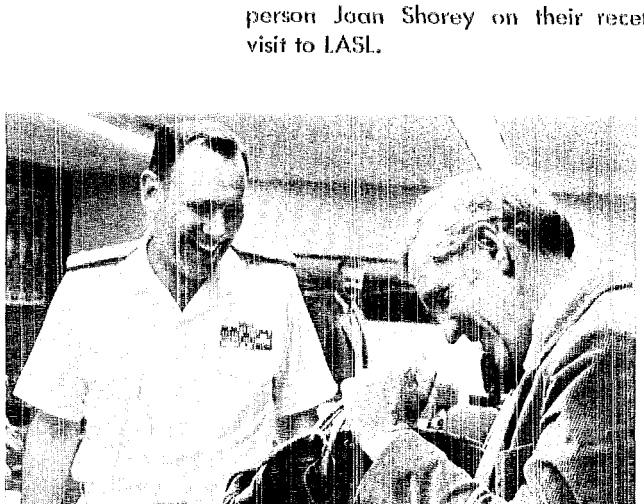
Hanging!

Someone was hanged in effigy from the water tower on Barranca Mesa near San Ildefonso Road and Chamisa, but it was not immediately determined who was the "victim." Police received a report Thursday morning about the "hanging." The dummy was hung about 150 feet in the air from the top of the tower sometime Wednesday night. There was no name or indication of whom the effigy depicted, and close inspection was impossible because no one had volunteered to cut it down.

Among Our Guests

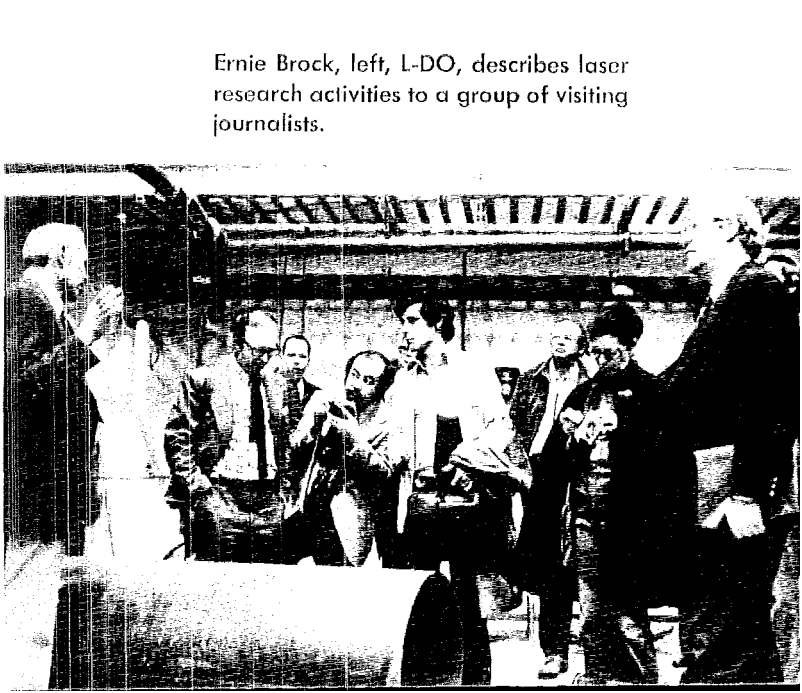
H. E. Edgerton, Institute Professor Emeritus at Massachusetts Institute of Technology and one of the founders of EG&G, spoke at "Strobe and Sonar" at a recent LASL colloquium. He is best known, perhaps, for his invention of the stroboscope in 1931.

J. Douglas Balcomb, assistant division leader for solar programs in LASL's Energy (Q) Division, explains the solar heating and cooling facilities of the National Security and Resources Study Center to U.S. Representative Richard Ottinger of New York, right, and staff person Joan Shorey on their recent visit to LASL.



Vice Admiral R. R. Monroe, director of the Defense Nuclear Agency, shares a humorous moment with LASL Director Harold Agnew. Monroe was at LASL recently for briefings.

Ernie Brock, left, L-DO, describes laser research activities to a group of visiting journalists.



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